

## PRE-TREATMENT OF DIFFERENT FIBERS – PART X

REF: TT/ JANUARY 2021/ WK 4

### SCOURING OF COTTON

The scouring of cotton fabric is a cleaning process to remove natural wax and non-fibrous impurities from the fibers. It is a process to remove all undesirable impurities like fats, wax, vegetable matter such as seed coat fragments, pectins, protein etc. Scouring process also removes added impurities such as oil stains, residual sizing material. Scouring process improves absorbency of cotton material. With the improved absorbency, water can transport dyes and chemical within the cotton fibres. Proper scouring is must for uniform dyeing and printing.

#### **Theory of Scouring**

Theories involved in scouring of cotton are:

- Saponification of fats into water soluble soap and water miscible glycerin
- Emulsification of non-saponifiable oils and waxes
- Hydrolysis of proteins into water soluble products
- Conversion of pectins and pectose into their soluble salts
- Dissolution of mineral matter
- Removal of dirt particle

**1) Saponification** – In simple terms, saponification is the process of making soaps. The chemical reaction between fat and sodium hydroxide (Caustic Soda) is a saponification reaction.

The vegetable oil present in the cotton fiber, which is immiscible with water, is glyceride of fatty acids. When such oils are heated with a solution of sodium hydroxide (Caustic soda) in water, the oil splits up into its constituent's fatty acid and glycerin. Glycerin is miscible with water easily and the fatty acid reacts with sodium hydroxide present in the solution forming its sodium salt i.e soap which is also soluble in water. Thus, oil is removed from the fiber.

**2) Emulsification** – Emulsification is the process of dispersing two or more immiscible liquids together to form a semi-stable mixture. Wax and non-saponifiable oils (Non polar) are removed by emulsification as they are immiscible in water (Polar). Normal washing soap is used as a emulsifying agent which make emulsion of them. Soap generated from the saponification process also act as an emulsifying agent.

Both of these processes (saponification and emulsification) take place in a conventional scouring process.

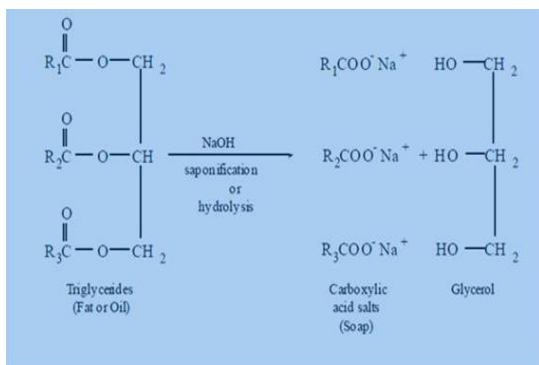


Fig 1.1 Saponification Process

Ref: drmsparmar.blogspot.com

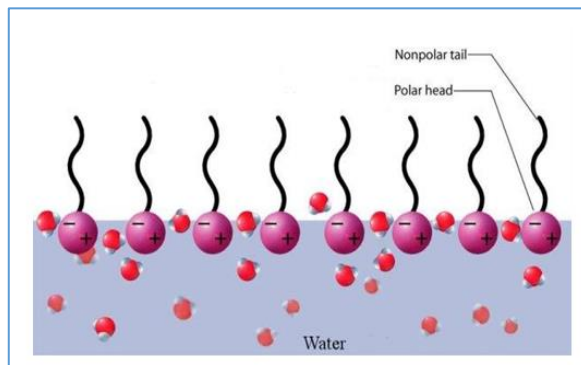


Fig 1.2 Emulsification Process

Ref: drmsparmar.blogspot.com

The scouring process also softens and swells the specks and helps to destroy and remove them from the fiber. The important parameters of the scouring process are:

- Concentration of caustic soda
- Type and concentration of auxiliaries
- Treatment temperature
- Treatment time

Two important auxiliaries used in scouring are chelating/sequestering agents and surfactants. Other auxiliaries that may sometimes be employed include antifoaming and lubricating agents. Sequestering agents are used to eliminate heavy metals, such as iron and copper which can affect the scouring process by preventing the soaps from precipitation. Precipitated soaps are insoluble and may settle on the fabric and produce resist spots.

References:

1. [www.fibre2fashion.com](http://www.fibre2fashion.com)
2. <https://indiantextilejournal.com/>
3. <https://slideshare.net>

.....To be continued.....

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Last week's Answers: 1) OXIDATIVE 2) AMYLASE 3) MALTOSE 4) MONOSACCHARIDES

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